NOTES ON CLEANUP STANDARDS MEETING - NOVEMBER 30, 1995

The working group developing a site-wide groundwater strategy and cleanup standards for RFETS met on Wednesday, November 30, 1995 from 9 00 to 12 30 at the EPA Building The session was mediated by personnel from Keystone and was attended by CDPHE, EPA, DOE, Kaiser-Hill and RMRS representatives No agenda or sign-up sheet were provided

Since DOE's legal staff could not attend, this meeting was for technical staff only No legal staff were present

The CDPHE single text document for all standards was provided This had been faxed to DOE, EPA and K-H at 5 00 the previous day This document has not undergone internal review It is a tight and not necessarily completely coherent document The italicized sections in the single text require resolution

CDPHE stated that their legal department felt that the Point of Compliance (POC) terminology could be avoided The CDPHE proposed Tier III wells were the same as POC wells without the title CDPHE felt that this should solve the POC issue

DOE clarified that the Vision was meant to be in-place when D&D and remediation were mostly completed, i e at the interim end state, not in the period when these activities were in full swing CDPHE promised to clarify that the Vision is the final state prior to walk-away in the text Additional clarification of the MOU between EPA and CDPHE which is yet to be developed will be added in the introduction

A line by line review of the attached single text followed Comments are compiled by section

Section	Comment
1 2	Discuss adding an interim ACL/final standards section later
1 3	Recognize that cities, counties and other local governments are included

Section 2 0/2.1
Second sentence is a legal issue Can it be deleted? These sections will all be reviewed by the various Legal departments and may not be resolved today, especially fines, penalties, compliance and rad issues

DOE states that they try and live up to standards, enforceable or not

CDPHE reminds group that this is a working group recommendation, not a legal decision Please think out of the box

K-H remarks that ACLs are given in second paragraph, second sentence, then taken away in 3rd sentence which states that standards must remain in place at POC EPA asks CDPHE for an explanation CDPHE states that ACLs apply to segment only, not in terminal ponds This is an attempt to relax standards during remediation and applies to waterways and in ponds However, an exceedance, whether in the pond or upstream does not obviate the need to do source control DOE requested clarification CDPHE stated that if source control did not allow standards to be met, then an ACL could be requested EPA was concerned about which actions are triggered by exceedances What actions are triggered, and why are these actions the same as triggered at POC?

CDPHE felt that these exceedances should trigger actions, and then ACLs could be granted In addition, if source control elevates the baseline, then this data can be used to raise the standard

Keystone clarified that these standards will apply at the end point, not in the segment until after D&D/closure

EPA stated that water standards were ARARs and applied at terminal ponds NPDES does not regulate rads

K-H requested clarification about when ACLs were applied and what actions are triggered
DOE asked whether any differences are seen between interim and end phase

CDPHE will provide a new proposal on
- how ACLs are applied,
- how monitoring will be used,
- clarification on where and how these will be regulated, and
- actions required when standards exceeded

The last paragraph of the section was in error The ponds will be included in Area 2, the Inner Buffer Zone, and the streams to the plant boundary will be in Areas 3 and 4 All agreed

Section 2 2
A 1 Pu standard of 0 15 pCi/l in Areas 2, 3, and 4 CDPHE stated that water quality division will only agree to 0 15 pCi/l applied state-wide and that there is no internal agreement to drop the domestic use from surface water EPA said that if group doesn't agree, then two proposals will be needed

C 1 Area 2
C 2 Area 2
C 3 Area 3 and 4
C 4 Area 3 and 4

C 1 b Table__ is warm water plus fish and domestic
Wasn't domestic to be removed? RMRS is this technically appropriate? No fish exist, and there is restricted access Could this be removed for the interim period, then add fish requirement in at the end? During interim period, these ponds will be used as storm water and spill control At the end, ponds will not be spill control and may be ecological preserves
CDPHE does not feel that a two tiered approach is needed as temporary modifications will handle these situations However, they will look into this

C 2 a Other points tbd is a placeholder Can Pond C-1 be deleted as this is not a downstream point?

C 3 a The table will be for domestic use

C 4 POC-please clarify that terminal ponds are not in Area 4
Outfall of terminal ponds is POC at the current monitoring point

Section 2 3
A This section will be expanded No comments please
B Placeholder only, is this RFCA, statutory or regulatory?

Should surface water be prioritized as an ER action? No, surface water is probably the top priority

Clarify the time frame 30 days is not long enough to receive rad sample results This was meant to state that actions need to be initiated within 30 days of receiving results

Section 3 2
The groundwater Tier II and Tier III (POC) are the same The difference is

- exceedances of Tier II wells triggers an evaluation of the plume
- exceedances of Tier III wells triggers an action This can be taken upgradient of the point where the plume impacts surface water

RMRS-Shouldn't a measurable impact on surface water be seen to require action?
CDPHE-No The mission is clear that surface water quality must be maintained
RMRS-If we are protecting surface water, and organisms are not being harmed, why spend money remediating a non-problem?
CDPHE-That's why we have standards Surface water will not be used as the groundwater POC
DOE-What if a temporary pulse of contamination was moving through, should something be done?
EPA-if there is no technical practicability, then actions should not be forced
CDPHE-In OU2, source removal must be followed by an action in groundwater Then ACLs will be used to take into consideration the harm being done to surface water This will be done on a case-by-case basis, and does not imply a catch

However, Tier II wells are **all** of the clean wells in the monitoring network
RMRS points out that some of these will be downgradient of the Tier III wells
Tier III wells will be the "POC" wells and will not necessarily be those previously chosen by the group

RMRS suggests that best management practice is to meld monitoring and RCRA requirements into a integrated RCRA and sitewide monitoring network EPA states that there seem to be an inordinate number of RCRA wells CDPHE recommends invoking section 3 4 A and modifying network to eliminate unnecessary "RCRA" wells

CDPHE prefers a groundwater action level of 100 X GW standards instead of 100 X MCLs as previously discussed

Action Items and Further Discussion
The next and final meeting will be Wednesday, December 6, 1995

Revised single text will be delivered to group by Friday

Major issues must be faxed to Todd at Keystone by Tuesday morning along with opinions on where the group may not come to agreement

RMRS (A Primrose) will provide a table of SW standards vs 100 X MCLs vs SW PPRGs for the next meeting

RMRS (T Lovseth) will provide a list of the new proposed Tier III wells by Monday morning

CDPHE (Jeb Love) requested that all parties check with their ecology staff to see if the subsurface action levels proposed will be protective of animals breathing air in their tunnels

CDPHE (Carl Spreng) inquired about whether the Vision talks about protecting groundwater resources in Areas 2 and 3? DOE informed him that the Vision hangs its hat on surface water protection

CDPHE (Judy Bruch) what about non-VOCs in subsurface soil? EPA replied that action levels for non-VOCs in the Industrial Area will be the PPRGs for construction worker This brought up the point that we will be excavating soil to protect people excavating soil

Followup Discussion Items
Integrated Water Management Strategy Meeting

November 29, 1995

1. OU1/OU2 Treatment Facility - Kevin Conroy

- Effects of using OU2 chemical precipitation facility for post treatment

2. TTF - Kevin Conroy

- How will TTF be monitored to ensure that the 150 pCi/L effluent limit is not exceeded

3. Stream Loading - John Law

Yearly range from 1988 to 1984 was 0.9 to 115.1 microcuries

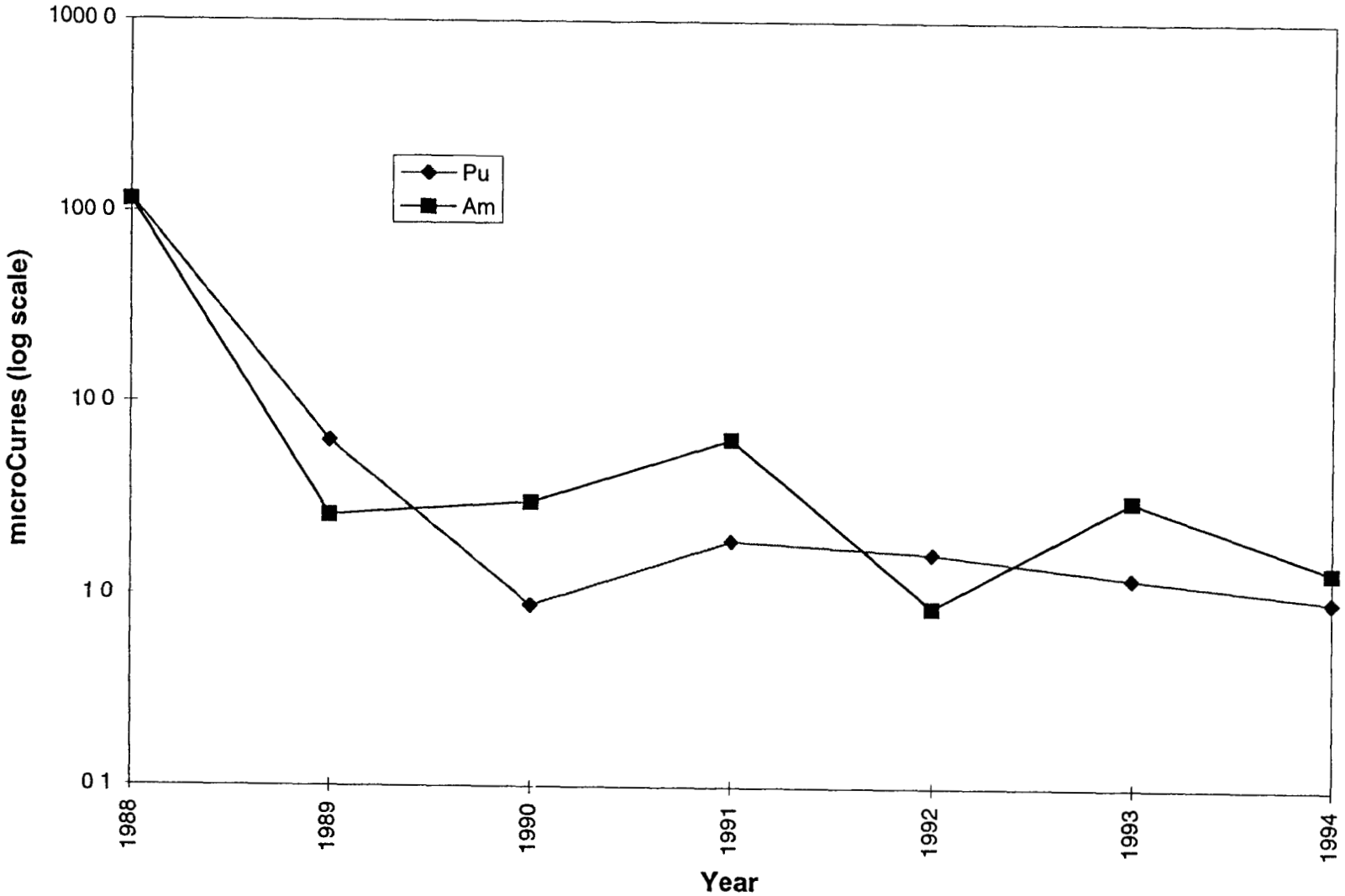
Projected values

- Liquid stabilization 30,000L x 150 pCi/L = 4.5 microcuries over 3 years

- Tank flushes 500,000 gal/4L/gal * 150 pCi/L = 75 microcuries over 5 years

Note: we can update this estimate bases on total load to the TTF, but these are the two prime hitters

Annual Cumulative Pu and Am Discharge Amounts



Annual Cumulative Pu and Am Discharge Amounts

Pu

Year	TOTAL
1988	117 8
1989	6 3
1990	0 9
1991	1 9
1992	1 6
1993	1 2
1994	0 9

Am

Year	TOTAL
1988	115 1
1989	2 6
1990	3 0
1991	6 4
1992	0 9
1993	3 1
1994	1 4

Rocky Flats Environmental Technology Site

Action Level Framework for Surface Water, Ground Water, and Soils

Table of Contents

1 0 General Background

1.1 Goal of Action Level Framework at RFETS

On October 10 and 11, 1995, a "Workout Session" was convened between DOE, EPA, CDPHE, DNFSB, and Kaiser-Hill to resolve, or develop a path to resolve, all outstanding issues associated with the new Rocky Flats Cleanup Agreement (RFCA) Several of the significant Workout Session outcomes include agreement on a conceptual vision of the end-state of RFETS after closure and cleanup, and agreement that the environmental cleanup of the site will now be implemented through a "carve-out" approach The conceptual vision designated the approximate areal extent of four future land uses These include capped areas underlain by eitherwaste disposal cells or contaminated materials closed in-place, an industrial area, an inner buffer zone managed as open space, and an uncontaminated outer buffer zone that, while it will be managed as open space, actually could be used for any use The carve-out will be implemented such that EPA will be the lead regulatory agency over the buffer zone, and CDPHE will be the lead regulatory agency over the industrial area

As a result of the Workout Session, a working group was formed to develop a consensus position on the appropriate cleanup standards that should apply to RFETS This Action Level Framework presents the final product of the working group It has been developed in a manner generally consistent with the conceptual vision and carve-out In some cases, the working group found it necessary to more precisely define aspects of the conceptual vision so that applicability of action levels and required mitigating actions could be completely defined The goal of the Action Level Framework is to

a provide a basis for future decision-making,
b define the common expectations of all parties, and
c incorporate land- and water-use controls into site cleanup

The working group consisted of DOE, EPA, CDPHE, and Kaiser-Hill staff This document represents a consensus of these parties

1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related programmatic or site-wide assumptions

1 The framework must be consistent with the Conceptual Vision
2 Implementation of the framework must protect human health and the environment
3 Implementation of the framework must protect surface water uses and quality

1.3 Outside Factors

The working group recognizes that there are several factors outside of our control Foremost among these factors is the Water Quality Control Commission (WQCC) The WQCC determines water quality standards throughout Colorado The consensus position presented herein delineates several changes to existing use designations and standards for water at RFETS There is no guarantee that the WQCC will make the changes this document recommends

Another factor that could affect the positions presented in this document include public response to the conceptual vision, other Workout Session issue resolutions, and these action levels

2 0 SURFACE WATER

2 1 Different from the other media, action levels will not apply to surface water Rather, the standards promulgated by the Water Quality Control Commission (WQCC) will be applied to the surface water at RFETS In addition, points of compliance have been delineated to measure water quality and compliance ramafications are delineated This is consistent with the Vision Some of the surface water quality standards proposed herein differ from the existing water quality standards These will necessitate a review and change by the WQCC CDPHE agrees to jointly approach the WQCC with DOE and Kaiser-Hill to accomplish these changes Modification requests for the surface water quality standards must provide sufficient rationale and justification to document that all existing and potential uses will be protected

In specific areas where practical remedial efforts fail to lower contaminant concentrations below the standards, the implementing agencies (EPA and CDPHE-HMWMD) will authorize alternate concentration limits, if sufficient rationale and justification are provided Temporary and area-specific alternate concentration limits may also be proposed during approved remedial activities which are expected to impact surface water Setting alternate concentration limits will not affect required compliance at the outfall of the terminal ponds and may require future re-assessment of impacts to other affected media

Surface water exists in Areas 3 and 4 of the Vision, as well as immediately off-site The standards and points of compliance presented below are based on the following "fine-tuning" of the Vision-delineated areas

A Area 3 will include all surface water down to, and including, the terminal ponds

B Area 4 will include the streams from the terminal ponds to the plant boundary

2 2 Standards

A Plutonium Standard

1 The plutonium standard that will apply in both Area 3 and Area 4 surface water is *[0 15 pCi/L]*

[The sitewide standard is currently protection of ambient water quality and is quantified as 0 05 pCi/L from data gathered at the eastern site boundary CDPHE would support changing the ambient Pu standard to a health-based standard of 0 15 pCi/L (10^{-6} value based on domestic consumption) However, non-degradation of ambient conditions remains as the sitewide goal with 0 05 pCi/L as a remedial design goal The 0 15 proposed value requires approval from the WQCC to become effective If Pu levels exceed 0 15 pCi/L at the points of compliance or at the monitoring points, based on a 30-day moving average, then a source identification and control feasibility determination (including simulation of effect) must be performed If feasible, remediation will be required, if not, then CDPHE would support a DOE petition to the WQCC to change the standard]

[If a higher action level is needed based upon infeasibility, any newly proposed action level should be based on stream loadings and fate and transport

considerations Changes in action levels will only be appropriate if compliance with surface water standards is maintained at points of compliance Action level monitoring points will be established by consensus of all parties at new or existing monitoring sites at appropriate locations in various stream segments (e g , SW093 in N Walnut Creek, GS10 in S Walnut Creek, SW027 at the influent to C2, etc)]

2 Points of Compliance will be placed at *[the terminal pond outfalls]*

3 Compliance will be measured using a *[30-day moving average]*

B Americium Standard

1 The americium standard that will apply in both Area 3 and Area 4 surface water is *[0 15 pCi/l]*

2 Points of Compliance will be placed at *[the terminal pond outfalls]*

3 Compliance will be measured using a *[30-day moving average]*

C Non-radiological standards

1 Area 3 = Big Dry Creek Segment 5

a) The standards that apply throughout the designated stream segment are based on current and reasonably foreseeable surface water uses consistent with the Vision

- Aquatic Life - Warm 2
- Recreation 2
- Agricultural

b) The numerical standards associated with each of these use classifications is included in Table __ (Currently, a domestic use classification also applies to this segment This proposal would necessitate a change to existing classifications)

2 Area 3 Points of Compliance

a) In order to protect aquatic life in this segment, the points of compliance for non-radionuclides will include points at the influent to Ponds A-3, B-3, C-1, and C-2 (first on-channel ponds), and other points to be determined

b) Compliance will be measured using a *[30-day moving average]*

3 Area 4 = Big Dry Creek Segment 4

a) The standards that apply throughout the designated stream segment are based on current and reasonably foreseeable surface water uses consistent with the Vision

- Aquatic Life - Warm 2
- Recreation 2
- Agricultural

- Domestic Use

b) The numerical standards associated with each of these use classifications is included in Table __ (This does not represent a change to the current use classifications)

4 Area 4 Points of Compliance

a) In order to protect any use in this segment, as required by the Vision, and to protect surface water that is no longer within DOE's control, the points of compliance for non-radionuclides will be placed at the outfalls of the terminal ponds

b) Compliance will be measured using a *[30-day moving average]*

2 3 Non-compliance Action Determinations

A When contaminant concentrations exceed the surface water standards at a point of compliance, a determination of the contaminant source must be undertaken If the source can be identified, it must be mitigated If the source can not be delineated, surface water use protection must be evaluated *[????]*

B Only when DOE and/or Kaiser-Hill (or appropriate sub-contractors) fail to report exceedance of the standards for a period longer than that allowed by the regulations, or when DOE and/or Kaiser-Hill (or appropriate sub-contractors) fail to take the actions delineated above within 30 days of the known exceedance, will DOE and/or Kaiser-Hill be subject to regulatorily defined fines and penalties

3 0 GROUND WATER

3 1 Action levels for ground water must be protective of surface water standards and quality As stated in the Conceptual Vision for RFETS, domestic use of ground water at RFETS will be prevented through institutional controls No other human exposure to ground water is foreseen Therefore, the ground water action levels are not based upon human health protection *[Ecologic protection - i e , seeps??]*

3 2 Action Levels The strategy for ground water is intended to prevent contamination of surface water Ground water standards will, therefore, be the same as surface water standards Action levels are based on these standards - the action levels trigger and guide ground water management actions A three-tiered action level approach is presented below and is dependent on contaminant concentrations and location within a plume

A Tier I - Near-Source Action Levels
1 Action levels = 100 x *[MCL]*
2 Applies in areas of high ground water contaminant concentrations
3 Designed to identify high concentration ground water "sources" that present a near-term risk to surface water and should be addressed through an accelerated action

B Tier II - Distal Action Levels
1 Action levels = Ground water standards
2 Applies at distal ends of plumes or downgradient of plumes in valley-fill alluvium
3 Designed to prevent ground water contaminated above surface water standards from reaching surface water by triggering ground water management actions when necessary
4 Tier II wells have been selected by mutual agreement of all parties from the monitoring well network See Section 3 4 A 1

C Tier III - Surface Water Protection Action Levels
1 Action levels = Ground water standards
2 Tier III wells have been selected by mutual agreement of all parties from the monitoring well network See Section 3 4 A 2

3 3 Action Determinations

A Tier I
1 If Tier 1 action levels are exceeded, a pathway evaluation will be performed Such a pathway evaluation may include a trend analysis based on existing data showing that there is no significant decreasing trend in ground water contaminant concentrations over 2 years *[However, if a subsurface soil*

removal has been performed within the plume area, trend analysis can be performed with subsequent data] If the pathway evaluation indicates that ground water exceeding ground water standards will emerge into surface water, then a process to identify, evaluate, and implement efficient, cost-effective, and feasible ground water management action is triggered

2 Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II and Tier III wells (e g , lower-level, but fast-moving contamination) The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis

3 Any accelerated actions will be taken in accordance with the Conceptual Vision document and incorporated into the Environmental Priority List

B Tier II

1 If concentrations in a Tier II well exceed the ground water standards during a regular sampling event, monthly sampling in that well will be required Three consecutive monthly samples showing contaminant concentrations greater than ground water standards will trigger additional action

2 Required actions will initially consist of additional evaluation to determine if remedial or management action is necessary to prevent ground water contaminated above ground water standards from reaching surface water If action is necessary, the type and location of the action will be delineated and implemented

C Tier III

1 If concentrations in a Tier III well exceed the ground water standards during a regular sampling event, monthly sampling in that well will be required Three consecutive monthly samples showing contaminant concentrations greater than ground water standards will require a remedial action The action will be determined on a case-by-case basis, but will be designed to treat, contain, manage, or mitigate the contaminant plume

2 Situations where ground water contaminated at levels above the ground water standards is currently emergent into the surface water will trigger a Tier III action

D Efficient, cost-effective, and feasible actions that are taken to remediate or manage contaminated ground water may not necessarily be taken at the leading edge of plumes, but rather at a location within the plume Factors contributing to this situation could include technical impracticability at the plume edge, topographic or ecologic problems at the plume edge, etc The parties recognize that this situation may result in a portion of a plume that will not be remediated or managed This plume portion may cause exceedance of ground water standards at Tier III wells or exceedance of surface water standards When an action is taken that results in this situation, DOE and Kaiser-Hill may request relief from the ground water and/or surface water standards CDPHE and EPA will evaluate the request and may grant

temporary relief or alternate concentration limits

3 4 Ground Water Monitoring Network

A The ground water monitoring network has been modified recently through agreement by all parties This monitoring network will continue to operate as established unless subsequent changes are agreed to by all parties Tier II and Tier III wells have been selected from the current monitoring network where practical and new wells will be proposed where apparent gaps exist The designated wells can be found in Table __

1 Tier II wells are all monitoring wells (except Tier III wells) in which ground water is currently uncontaminated or contaminated at levels currently below ground water standards

2 Tier III wells are currently uncontaminated In general, Tier III wells are located between the downgradient edge of each plume and the surface water towards which the plume is most directly migrating They are not chosen with regard to the location of surface water points of compliance If additional plume information dictates, new or alternate wells may need to be chosen

B All ground water plumes that exceed the ground water standards must continue to be monitored

4 0 SUBSURFACE SOIL

4 1 Action levels for subsurface soil are protective of

A human exposure appropriate for uses described in the Vision document,

B surface water standards via groundwater transport, and

C ecological exposure appropriate for uses described in the Vision document

4 2 Action Levels The subsurface soil action levels have been calculated using a two-tier approach Tier I, the upper tier, has been developed to identify source areas that will be addressed through an accelerated action Tier II, the lower level, has been developed to be protective of human and ecological exposure, as well as protective of surface water quality

A Tier I

1 All subsurface soils capable of leaching volatile organic compounds to groundwater at concentrations greater than or equal to 100 x *[MCL]* will trigger subsurface soil source removals

2 Contaminant-specific action levels have been determined using a soil/water partitioning equation and a dilution factor from EPA's Draft Soil Screening Guidance, (1994) These values are listed in Table 1 The subsurface media characteristics for these calculations are based on site-specific data or conservative values where representative site values can not be determined Where subsurface characteristics in a particular area within RFETS differs significantly from those chosen as representative of the entire site, those alternate values should be used

3 No Tier I action levels have have been determined for non-volatile contaminants due to their generally limited mobility in soil

B Tier II

1 Human exposure to subsurface soil is envisioned only in the Industrial Area (Area 1 in Vision) Therefore, action levels protective of human exposure are calculated on the basis of Construction Worker exposure This includes dermal contact with and direct ingestion of subsurface soils, inhalation of particulates and VOCs, and external irradiation The attached table (Table ___) provides the equations used and the values derived for this exposure scenario

2 Additional subsurface soil may need to be remediated or managed to protect surface water quality via ground water transport or ecological resources The amount of soil and the protective remediation levels or management techniques will be determined on a case-by-case basis *[Subsurface soil presenting unacceptable ecological risks (HI ≥ 1) identified using the previously approved ecological risk assessment methodology will be evaluated for remediation or management Where remedial actions to protect ecologic resources can be implemented without damaging other ecologic resources, remediation and/or management*

actions will be implemented] [What about protecting uncontaminated ground water beneath or in the vicinity of contaminated soil??]

4 3 Action Determinations

A When contaminant levels in subsurface soil exceed action levels, or when an action is necessary to protect surface water or ecological resources, a process to identify and evaluate efficient, cost-effective, and feasible remediation or management actions will be triggered

B Appropriate management actions will be determined through this process on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated surface soils

C These actions may be implemented by means of an accelerated action or addressed as necessary in the ROD for the affected area

D Single geographically isolated data points of subsurface soil contamination above the values in Table ___ will be evaluated for potential source magnitude These single points will not necessarily trigger a source removal, depending on the source evaluation

E The need to excavate below the water table for source removal actions will be determined on a case-by-case basis

F Any accelerated actions will be taken in accordance with the Vision document and incorporated into the Environmental Priority List

5 0 SURFACE SOIL

5 1 Surface soil will be defined to be the upper six inches of soil Action levels for surface soil are protective of

A human exposure appropriate for uses specified in the Conceptual Vision document,

B surface water quality via runoff, and

C ecological exposure appropriate for uses specified in the Conceptual Vision document

5 2 Action Levels The surface soil action levels are calculated on the basis of protection of appropriate human exposure All surface soil contaminated at levels above the action levels will be remediated or managed in such a way as to mitigate the unacceptable human exposure

A Human Exposure - The attached tables provide the equations used and the values derived for these exposure scenarios

1 Industrial Area (Area 1 of Conceptual Vision) Action levels will be based on Office Worker exposure This includes dermal contact with and direct ingestion of surface soil, inhalation of particulates and VOCs, and external irradiation

2 Inner Buffer Zone (Area 2 of Conceptual Vision) Action levels will be based on Open Space exposure This includes dermal contact with, incidental ingestion of, and particulate inhalation of dust, surface soil or dry sediment, and external irradiation

B Additional soil may need to be remediated or managed to protect surface water quality via runoff or ecological resources The amount of soil and the protective remediation levels and/or management technique will be determined on a case-by-case basis

5 3 Action Determinations

A When contaminant levels in surface soil exceed action levels, or when an action is necessary to protect surface water or ecological resources, a process to identify and evaluate efficient, cost-effective, and feasible remediation or management actions will be triggered

B Appropriate management actions will be determined through this process on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated surface soils

C These actions may be implemented by means of an accelerated action or addressed as necessary in the ROD for the affected area

D Any accelerated actions will be taken in accordance with the Conceptual Vision document and incorporated into the Environmental Priority List

SURFACE WATER STANDARDS AND GOALS

Purpose of the Ponds

Interim

Storm Water Management
NPDES Spill Control (SPCC/BMP)

Note Ecological enhancement is an incidental benefit and not a managed goal

Final (post ASAP)

Not operational for current interim uses

General Considerations

- Goals should be based on risk and use (real exposures) Releases from the site can now enter a drinking water supply, but are diluted and treated
- When Option B (Broomfield alternative water supply and Woman Creek Reservoir) is fully implemented, these waters cannot directly enter public drinking water supplies Long-term uses of these waters cannot be reliably be predicted
- DOE currently loses control of the water beyond the terminal ponds
- The point of measurement is typically set at the site boundary (Indiana Street) Measurement at this point allows for some additional settling and mixture with additional runoff
- Current batch flow terminal pond discharge concentrations are below 0 05 pCi/l, but require costly operations, decrease dam safety and limit availability of storage during storms when actinides are most likely to move
- Flow-through operations are desired for A & B series Terminal pond discharge concentrations (A & B Series) are anticipated to be around 0 05 pCi/l under flow-through conditions Actual performance cannot be precisely predicted and will be measured C-2 will remain in batch mode until remediation efforts are proven successful
- Temporary Treatment Facility Life-cycle (11 year) Costs (during liquid residue stabilization and initial tank rinsing 1997 - 2002, D &D through 2008) - 150 to 15 pCi/l cost $111 M 15 - 0 15 pCi/l cost is $170 M (Assume 10 fold dilution in Sewage Treatment Plant)

- Risk based (1×10^{-6}) drinking water PPRG is 0 15 pCi/l for Pu & Am Risk based open space PPRG is 141 pCi/l for Pu & Am

- The current Site Vision for surface water is somewhat contradictory

Surface Water Standards and Goals

Radionuclide Goals

Background

- A Series Ponds Pu - 5 3 pCi/l maximum observed inflow concentration Average inflow value is 0 3 pCi/l

- B Series Ponds Pu - 1 4 pCi/l maximum observed inflow concentration Average inflow value is 0 19 pCi/l

- C-2 Pond Pu - 0 42 pCi/l maximum

Interim Operational Goals and Point of Measurement

Treatment Plant Discharges - 15 pCi/l

A-4 Discharge - Pu and Am at 0 3 pCi/l

B-5 Discharge - Pu and Am at 0 2 pCi/l

C-2 Pond - Pu and Am 0 5 pCi/l

Note All pond discharge values assume no treatment plant influent to any ponds All values are 30 day averages

Potential Long-Term Goals for Waters Leaving Rocky Flats

Statewide risk based standard for drinking water use

140 pCi/l +/- for recreational uses/aquatic/agricultural (15 mrem EPA/NRC)

Non-Radionuclide Standards

Interim Operational Goals and Point of Measurement

Ponds and upstream controlled/limited access through completion of ASAP
Therefore, aquatic life and agricultural standards should apply in this reach
Water + fish is not applicable

Below the terminal ponds, water + fish could apply depending on downstream uses to be determined in conjunction with downstream users

Measurement points
- pond grab samples
- below terminal pond and treated water discharges